NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

POND SEALING OR LINING - FLEXIBLE MEMBRANE

(No.)

CODE 521A

DEFINITION

A manufactured hydraulic barrier consisting of a functionally continuous sheet of synthetic or partially synthetic, flexible material.

PURPOSE

To control seepage from water and waste impoundments for water conservation and environmental protection.

CONDITION WHERE PRACTICE APPLIES

On ponds and water storage structures that require treatment to control seepage rates within acceptable limits.

On earthen waste storage and waste treatment facilities, and which require treatment to reduce seepage of contaminants from the storage structure.

CRITERIA

Laws and Regulations. Liners must be planned, designed and constructed to meet all federal, state, and local regulations.

Design. Structures to be lined shall have been constructed to meet all applicable NRCS standards. All inlets, outlets, ramps, and other appurtenances may be installed before, during, or after the liner placement, but shall be done in a manner that does not damage or impair the proper operation of the liner.

Design of the flexible membrane shall be in accordance with the manufacturer's recommendations. All flexible membranes shall be installed in accordance with the manufacturer's recommendations and by a qualified installer approved and certified by the New Mexico Environmental Department. Manufacturer recommendations shall be followed regarding vent type and spacing.

Manufacturer recommendations shall be followed with regard to protection from weather and exposure.

Minimum Criteria for Membranes		
Type	**Limiting Parameter**	
	Wastewater	Clear Water
HDPE	40 mil	30 mil
LLDPE	40 mil	20 mil
PVC	30 mil	20 mil
GCL	0.75 lb/sq ft (bentonite)	
EPDM	45 mil	
PP (Reinforced) (Unreinforced)	 36 mil 40 mil	 24 mil 20 mil
RPE	Not Recommended	24 mil

HDPE = High Density Polyethylene
LLDPE = Linear Low Density Polyethylene
PVC = Polyvinyl Chloride
GCL = Geosynthetic Clay Liner
EPDM = Synthetic Rubber
PP = Polypropylene
RPE = Reinforced Polyethylene
1 mil = 1/1000 of an inch

Cover Soil. PVC and GCL liners shall be covered with a minimum of 12 inches of soil.

Select soil materials shall be used as cover for liners where required for the proper performance, protection, and durability of the installation. Cover soils shall not contain sharp, angular stones or any objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-in (10 mm), unless the liner is cushioned by a needle punched, non-woven geotextile. Cover materials shall be stable under all operational and exposure conditions.

Subgrade Preparation. Subgrade preparation shall conform to manufacturer recommendations. Subgrade materials shall

not contain sharp, angular stones or any objects that could damage the liner or adversely impact its function.

Padding. A cushion or padding shall be placed beneath the liner if the subgrade particles contain sharp angular stones that could damage the liner or particles greater than ⅜-inch for geomembrane liners and ½-inch for geosynthetic clay liners. The padding or cushion may be a heavy non-woven geotextile or properly graded soil.

Anchorage. Liners shall be anchored to prevent uplift due to wind or slippage down the side slope.

Safety. All structures shall be fenced to protect the liner from damage and for the safety of humans, livestock, wildlife and pets. Warning signs shall be displayed in visible locations around the structure.

CONSIDERATIONS

Venting should be considered if gas build-up under the liner is anticipated.

If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems should be considered to control uplift pressures.

DRAWINGS AND SPECIFICATIONS

Drawings and specifications shall be prepared for specific field sites in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended uses.

As a minimum, the drawings and specifications shall provide the following:

1. Layout of the waste containment facility, waste collection points, waste transfer locations or pipelines, topography of the site
2. Required liner materials, cushion materials, pipeline materials
3. Details of liner installation, seaming requirements, and quality control testing
4. Fence and signage requirements

OPERATION AND MAINTENANCE

A plan for operation and maintenance (O&M) of the liner shall be prepared. The plan shall be consistent with the purposes of the type of liner chosen, its intended life, safety requirements and criteria for its design. The plan shall contain requirements including but not limited to:

1. Design capacity and liquid level of the structure.
2. A description of the normal operation, safety concerns and maintenance requirements.
3. Repair procedures.
4. Periodic inspection of the following:
    - Visible portions of the liner for tears punctures, or other damage
    - Liner interface with inlets, outlets, ramps, or other appurtenances for damage
    - Liquid level in the structure
    - Ballooning of the liner indicating presence of gas beneath the liner

REFERENCES

Quality Assurance and Quality Control for Waste Containment Facilities, EPA/1600/R-93/182, September 1993.

NRCS, “Agricultural Waste Management Field Handbook,” National Engineering Handbook, Part 651.